O P E R A T I N G I N S T R U C T I O N S

STEAM STERILIZER

K S G 25-2-5

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ATTENTION

DOOR OF THE APPARATUS

CAN ONLY BE OPENED

IF THE UNIT

IS CONNECTED

TO ELECTRIC CURRENT

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1. Short Operating Instructions

Filling of storage tank with distilled water
Control the water level of storage tank, refill water if necessary.

Switching on the sterilizer
By the **ON**/**OFF** switch at the sterilizer.

Unlocking and opening of chamber door
Press key **<T>** continuously. Swivel closure lever to the left side in horizontal position and open the door plate.

Filling of chamber water
By continuous pressing of key **Filling** water is filled into the chamber until the water level has reached the top edge of the land at the front side of the chamber.

Loading of the sterilizer
Put the goods to be sterilised on the bottom plate resp. into the insert rack. If necessary, place the PT 100 bottle sensor into a reference receptacle.

Closing and locking of chamber door
Take care that the closure lever is in its horizontal position. Press the door plate against the chamber and turn the closure lever to the right to the top until it reaches its vertical position.

Program selection
By pressing key **P1** program *solids 134 °C* is selected.

By pressing key **P2** program *solids 121 °C* is selected.

By pressing key **P3** program *Liquids 121 °C* is selected.

By pressing key **P4** program *Liquids variable* is selected.

Start of the program
By pressing key **START** the program is started.

End of the program
The end of the program is indicated by display text **End**.

Unlocking and opening of chamber door – removal of sterilised goods
Check the chamber pressure at the pressure gauge for chamber. If the needle points to **0**, the message end is indicated at the display and the LED of key**<T>** is illuminated, the chamber door can be opened. Press key **<T>** continuously and at the same time swivel the door lever from the horizontal to the vertical position. Afterwards the door can be opened at the door lever.

Attention: When opening the chamber door hot steam may escape.

Attention: The sterilised goods can also still be hot.

After having removed the goods, water can be added to the chamber by continuous pressing of key **Filling** and the sterilizer can be loaded for the next sterilisation.

By opening the chamber door the display is reset into the main menu. Before restarting the unit, a new program selection is necessary.

Switching off the sterilizer
For switching off the unit, the green ON/OFF switch must be pressed accordingly (control lamp goes out).

Attention: Inner chamber and insert plate have to be cleaned regularly.
Do not use steel wool!

Attention: Maintenance of the unit must be carried out by experts in regular intervals.

2. Use

2.1. Use of the Sterilizer

The sterilizer KSG 25-2-5 in its present execution can be used for the sterilisation of **liquids** and **unwrapped, non-porous solids** such as instruments, glass- rubber- and plastic- goods at sterilising temperature between 105 °C and 134 °C.

Since the sterilizer work according to the law of gravitation no porous goods (i.e. textiles), no hollow bodies (i.e. tubes) and no wrapped goods (i.e. shrink or paper foil, cassettes) can be sterilised. Hollow body receptacles may be sterilised on a perforated plate with the opening downwards.

Liquids can be sterilised in open or closed sterilising receptacles.

The sterilising time must be chosen according to the sterilising temperature. Material features should be considered when choosing the parameters and the kind of loading.

Highly inflammable materials should in no case be sterilised.

Living beings may not be sterilised.

Liquids – Cycle times

	Heating from 20 to 121 °C	Sterilisation	Cooling down to 80 °C media temperature	
1 flask of 0,5 litre	35 min			approx. 180 min.
3 flasks of 1 litre = 3 litres	approx. 50 min			approx. 190 min.
5 flasks of 1,8 litres = 9 litres	approx. 60 min			approx. 325 min.

☐ Self-Cooling

2.2. Aim of Use

The aim of the sterilisation is the achievement of sterility of a sterilizer charge after the sterilisation process.

Hint: Sterile is the condition of a (medical) product which is free of viable microorganism (EN 556).

3. Installation Instructions / Setting into Operation

Place of installation: The unit must be placed on a plain horizontal ground. A small unevenness can be balanced by screwing the feet of the apparatus on resp. off. Control this process by a bubble level. Take care that the area on which the apparatus will be placed is suitable for the weight of the sterilizer.

Current supply: KSG 25-2-5 must be connected acc. to chapter 12 Technical Data. Compare the indications on the type plate fixed at the right side of the sterilizer with the data at site. Then connect to the current supply.

Unlocking and opening of chamber door: Switch the unit on at the main ON/OFF switch. Press key **<T>** continuously while swivelling the vertical orientated closure lever to the left side in horizontal position. Then open the door plate and take all goods and packing materials out of the chamber. Check on the completeness of the accessories and delivered articles.

Putt the insert plate into the chamber considering that the cut-out is at the front side.

On opening the door check if the emptying valve (corner valve located on the upper right side behind the chamber door) is closed.

Horizontal slot	valve is closed
Vertical slot	valve is open

Filling of storage tank: Make sure that the emptying valve of the storage tank is closed. Before filling the storage tank open the lid on the top of the sterilizer. Underneath is the lid of the storage tank which is to open. The process water is to be filled into this opening until the maximum mark “max” (approx. 12,8 litres for the first filling). Close both lids after the filling process.

Process water: Do only use distilled, desalted or demineralised water. Do not use tap water, as this would attack and destroy the stainless steel of the unit (chamber) due to its furring. The cross sections of the tubes will be reduced by this furring, the magnetic valve mechanics cannot close orderly and pressure and temperature sensors will give incorrect data to the microprocessor command. Thus a correct operation of the unit will no longer be guaranteed. A negative influence on the goods to be sterilised can also not be avoided.

Attention: The storage tank may only be filled with distilled, desalted or demineralised water.

4. Operating / Indicating device

The operating / indicating module consists of three components: four-line display with 18 characters each, 12 program resp. function keys and the twelve-piece numerical and special function key group.

Depending on the program status the display shows all available programs resp. the current program number, the current program steps and their times as well as the stream or solution temperature in clear text. Error notes are shown in clear text in the first display line.

4.1. Program and Function Keys

Each key has its own status LED.

Keys **P1**, **P2, P3** and **P4** serve for selection of the sterilising program.

Key **<T>** unlocks the chamber door lever.

Key **Filling** serves for filling the water form the storage tank into the sterilising chamber.

Key **Start** starts the selected program.

Key ↵ **Enter** confirms the entered values in program 4.

Key ← **Clear** serves for returning to the main menu from a selected, but not yet started program.

By the key of the numerical pad sterilising temperature and time can be entered in program 4.

All unmarked keys are **without** function.

4.2. Description of Operation and Function Elements

4.2.1. Chamber pressure indicator

The chamber pressure indicator is attached beyond the operation/indication panel. The scale comprises a pressure range of -1 bar to +3 bar. The current chamber pressure is indicated by the needle of the indicating instrument, which shows the relative pressure. If the needle points to **0**, the chamber pressure corresponds to atmospheric pressure (approx. 1000 mbar). The pressure gauge is connected with the chamber via a tube connection. Thus the chamber pressure is continuously indicated, also in case of power failure.

4.2.2. Main switch

The green main switch is equipped with an additional lamp, which lights up when the switched is actuated.

4.2.3. Connection for recorder

On the front side of the sterilizer there are two contact bushings for connection of a line or point recorder. The signal (0 – 150 Ohm) transmits the current value of the PT 100 bottle sensor.

4.2.4. Thermic overheat protection

The sterilizer is equipped with a high highly active thermic overheat protection which switches off the heating in case of overheating.

5. Goods to be sterilised

Solids: solid (non-porous) goods (no hollow bodies), *unwrapped*.

Liquids*:* liquids in open or closed receptacles.

6. Programs

P1 Solids 134 °C Sterilising time 10 minutes

Sterilising program **P1** - for sterilisation of solids with a max. sterilising temperature of 137 °C

P2 Solids 121 °C Sterilising time 20 minutes

Sterilising program **P2** - for sterilisation of solids with a max. sterilising temperature of 124 °C

P3 Liquids 121 °C Sterilising time 20 minutes
Self Cooling

Sterilising program **P3** for sterilisation of liquids with a max. sterilising temperature of 124 °C

P4 Liquids var. Sterilising time 1 – 99 minutes
Self Cooling Sterilising temperature 105 °C - 121 °C

Sterilising program **P4** – for sterilisation of liquids with a max. sterilising temperature of 124 °C

7. Operating Instructions

Filling of the storage tank with process water
After opening the lid on the top of the sterilizer and the lid of the storage tank fill the storage tank with process water until the maximum mark “Max”. Close both lids after the filling process.

Switching on the sterilizer
The sterilizer is switched on by the green **ON**/**OFF** switch.

Display:

P1 = solids 134 °C	Program name
P2 = solids 121 °C	Program name
P3 = liquids 121 °C	Program name
P4 = liquids var.	Program name

Filling of chamber with process water
By continuous pressing of key **Filling** water is filled into the chamber until the water level has reached the top edge of the land at the front side of the chamber.
The water quantity is sufficient for the complete sterilisation.

Loading of sterilising chamber

Liquids
Before **sterilising liquids**, the flexible PT 100 sensor must be placed into the largest vessel or into a reference vessel of which the filling quantity corresponds to the filling quantity of the largest vessel to be sterilised.

When using a reference vessel, take care that the temperature of the reference liquid corresponds to the temperature of the medium to be sterilised. Thus the liquid in the reference vessel has to be refilled, especially before starting the sterilisation once again after a cycle. The consistency of the liquid in the reference vessel must correspond to the liquids to be sterilised.

Solids

When **sterilising solids** it is recommended to remove the reference receptacle from the chamber before loading and place the bottle sensor freely in the chamber. Any contact of the sensor stick with metal such as the chamber, the bottom plate or similar should be avoided. Don't place the sensor directly on the chamber bottom or into the chamber water.

The goods to be sterilised (solids) are placed in the chamber either on the bottom plate or on sieve trays of the insert rack.

Closing and locking of the chamber door
Take care that the closure lever is in its horizontal position. Press the door plate against the chamber before turning the door lever to its vertical position.

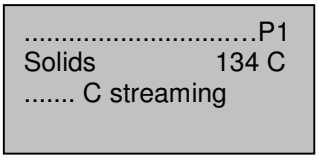
Program selection
The program selection depends on the type of goods to be sterilised.

After closing the chamber door the program can be selected. Four versions can be selected:

P1	Program 1	for solids	134 °C
P2	Program 2	for solids	121 °C
P3	Program 3	for liquids	121 °C
P4	Program 4	for liquids	variable

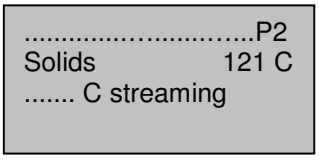
The programs are selected via the corresponding key. After starting the selected program is indicated by the corresponding LED.

Display: P1



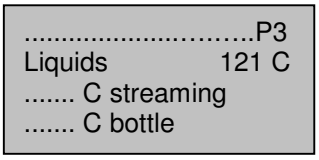
The first line is reserved for program number and error notes.
In the second line the program name is shown.
In the third line the current stream temperature is indicated.

Display: P2



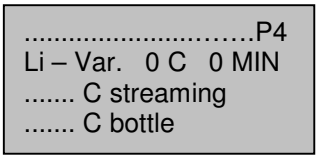
The first line is reserved for program number and error notes.
In the second line the program name is shown.
In the third line the current stream temperature is indicated.

Display: P3



The first line is reserved for program number and error notes.
In the second line the program name is shown.
In the third line the current stream temperature is indicated.
In the fourth line the current bottle temperature is indicated.

Display: P4



The first line is reserved for program number and error notes.
In the second line the program name is shown.
In the third line the current stream temperature is indicated.
In the fourth line the current bottle temperature is indicated.

Program Start
The program is started by pressing key **Start**. The LED of the resp. program key is illuminated.
The program can only be started when
a) the chamber lid is closed and locked
b) there is no error note (overheat/sensor defective)

8. Program Flow

8.1. Program 1 Solids 134 °C

Switching on
The sterilizer is switched on by the green main switch.

Display:

P1 = solids	134 °C	Program name
P2 = solids	121 °C	Program name
P3 = liquids	121 °C	Program name
P4 = liquids	var.	Program name

Unlocking and opening of chamber door
For unlocking the closure mechanism and open the chamber door, press key **<T>** continuously while swivelling the vertical positioned door lever to the left side in horizontal position and open the door.

Filling of chamber with process water
By continuous pressing of key **Filling** water is filled into the chamber until the water level has reached the top edge of the land at the front side of the chamber.
The water quantity is sufficient for the complete sterilisation.

Loading of the sterilising chamber
Solids (non-porous) goods (no hollow bodies) in unwrapped form.

The goods to be sterilised are placed in the chamber either on the bottom plate or on sieve trays of the insert rack.

When sterilising solids, PT 100 sensor must be placed **slackly** in the chamber. Take care that the sensor is not squeezed or bent.

The sterilising temperature with solids is measured in the streaming (chamber).

Closing and locking of the chamber door
Take care that the closure lever is in its horizontal position. Press the door plate against the chamber before turning the door lever to its vertical position.

Program selection
For selecting program 1 Key **P1** must be pressed.

The program can only be selected when chamber door is closed.

Display:

.....P1 Solids 134 °C ..... C streaming	Program number (Error note) Program name Streaming temperature

Program Start
Press Key **Start**

The program is set into operation by pressing button **Start**.
The program can only be started when
a) the chamber door is closed and locked
b) there is no error note <overheat - sensor defective – water shortage in the storage tank>

Display:

.....P1 heating up time ..... C streaming	Program number (Error note) Program step Streaming temperature

Step 1: Pressing out of chamber gasket
After having started the program, it runs down fully automatically. The chamber door gasket is pressed against the chamber door by the compressed air, produced by the small pressure generator. This provides a pressure-tight closure between chamber and door. The pressure level (approx. 1,5 bar) is determined by an adjusted pressure switch. The actual pressure is controlled by a pressure monitor, which releases further functions when pressure is available in sufficient quantity.

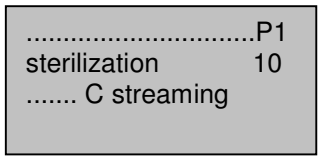
Step 2: Heating-up time / heating and regulation
The heating elements are switched on and heat up the process water in the chamber. They generate the steam necessary for sterilisation. The current chamber temperature (streaming) is indicated in the display.

Display:

.....P1 heating up time ..... C streaming	Program number (Error note) Program step Streaming temperature

Step 3: Sterilisation / Time Lapse
When the program specific temperature in the chamber (streaming) is reached, the sterilisation phase starts. The already passed sterilising time is indicated in the second display line.

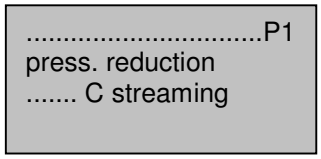
Display:



Program number (Error note)
Program step and current sterilisation time (count down)
Streaming temperature

Step 4: Pressure reduction
Discharging the steam from the chamber to the storage tank rain is executed automatically and lasts until chamber pressure has dropped to **0** bar.

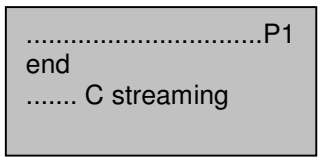
Display:



Program number (Error note)
Program step
Streaming temperature

Step 5: Release of chamber door
When the chamber pressure has dropped to **0** bar, the gasket is relieve. The release of the chamber door is indicated by **end**.

Display:



Program number (Error note)
Program step
Streaming temperature

Unlocking and opening of chamber door
For unlocking the closure mechanism and open the chamber door, press key **<T>** continuously while swivelling the vertical positioned door lever to the left side in horizontal position and open the door (LED of the program key goes out.

Attention: When opening the chamber door, hot steam can escape.

Removal of sterile goods

Attention: The sterile goods can still be hot.

After removal of the sterile goods, water can be added in the chamber (press key Filling) and the sterilizer can be loaded for the next cycle.

When opening the chamber door, the display is reset to the main menu. The LED of the program key goes out. A new program selection is necessary before starting again.

For switching off the unit, the green **ON**/**OFF** switch must be pressed accordingly (control lamp in the switch goes out).

8.2. Program 2 Solids 121 °C

Switching on
The sterilizer is switched on by the green main switch.

Display:

P1 = solids	134 °C	Program name
P2 = solids	121 °C	Program name
P3 = liquids	121 °C	Program name
P4 = liquids	var.	Program name

Unlocking and opening of chamber door
For unlocking the closure mechanism and open the chamber door, press key **<T>** continuously while swivelling the vertical positioned door lever to the left side in horizontal position and open the door.

Filling of chamber with process water
By continuous pressing of key **Filling** water is filled into the chamber until the water level has reached the top edge of the land at the front side of the chamber.
The water quantity is sufficient for the complete sterilisation.

Loading of the sterilising chamber
Solid goods (non-porous; no hollow bodies) in unwrapped form.

The goods to be sterilised are placed in the chamber either on the bottom plate or on sieve trays of the insert rack.

When sterilising solids, PT 100 sensor must be placed **slackly** in the chamber. Take care that the sensor is not squeezed or bent.

The sterilising temperature with solids is measured in the streaming (chamber)

Closing and locking of the chamber door
Take care that the closure lever is in its horizontal position. Press the door plate against the chamber before turning the door lever to its vertical position.

Program selection
For selecting program 2 Key **P2** must be pressed.

The program can only be selected when chamber door is closed.

Display:

.....P2 Solids 121 °C ..... C streaming	Program number (Error note) Program name Streaming temperature

Program Start
Press key **Start**

The program is set into operation by pressing button **Start**.
The program can only be started when
a) the chamber door is closed and locked
b) there is no error note <overheat - sensor defective – water shortage in the storage tank>

Display:

.....P2 heating up time ..... C streaming	Program number (Error note) Program step Streaming temperature

Step 1: Pressing out of chamber gasket
After having started the program, it runs down fully automatically. The chamber door gasket is pressed against the chamber door by the compressed air, produced by the small pressure generator. This provides a pressure-tight closure between chamber and door. The pressure level (approx. 1,5 bar) is determined by an adjusted pressure switch. The actual pressure is controlled by a pressure monitor, which releases further functions when pressure is available in sufficient quantity.

Step 2: Heating-up time / heating and regulation
The heating elements are switched on and heat up the process water in the chamber. They generate the steam necessary for sterilisation. The current chamber temperature (streaming) is indicated in the display.

Display:

.....P2 heating up time ..... C streaming	Program number (Error note) Program step Streaming temperature

Step 3: Sterilisation / Time Lapse
When the program specific temperature in the chamber (streaming) is reached, the sterilisation phase starts. The already passed sterilising time is indicated in the second display line.

Display:

.....P2 sterilization 20 ..... C streaming	Program number (Error note) Program step and current sterilisation time (count down) Streaming temperature

Step 4: Pressure reduction
Discharging the steam from the chamber to the storage tank rain is executed automatically and lasts until chamber pressure has dropped to **0** bar.

Display:

.....P2 press. reduction ..... C streaming	Program number (Error note) Program step Streaming temperature

Step 5: Release of chamber door
When the chamber pressure has dropped to **0** bar, the gasket is relieve. The release of the chamber door is indicated by **end**.

Display:

.....P2 end ..... C streaming	Program number (Error note) Program step Streaming temperature

Unlocking and opening of chamber door
For unlocking the closure mechanism and open the chamber door, press key **<T>** continuously while swivelling the vertical positioned door lever to the left side in horizontal position and open the door. (LED of the program key goes out.

Attention: When opening the chamber door, hot steam can escape.

Removal of sterile goods

Attention: The sterile goods can still be hot.

After removal of the sterile goods, water can be added in the chamber (press key Filling) and the sterilizer can be loaded for the next cycle.

When opening the chamber door, the display is reset to the main menu. The LED of the program key goes out. A new program selection is necessary before starting again.

For switching off the unit, the green **ON**/**OFF** switch must be pressed accordingly (control lamp in the switch goes out).

8.3. Program 3 Liquids 121 °C

Switching on
The sterilizer is switched on by the green main switch.

Display:

P1 = solids	134 °C	Program name
P2 = solids	121 °C	Program name
P3 = liquids	121 °C	Program name
P4 = liquids	var.	Program name

Unlocking and opening of chamber door
For unlocking the closure mechanism and open the chamber door, press key **<T>** continuously while swivelling the vertical positioned door lever to the left side in horizontal position and open the door.

Filling of chamber with process water
By continuous pressing of key **Filling** water is filled into the chamber until the water level has reached the top edge of the land at the front side of the chamber.
The water quantity is sufficient for the complete sterilisation.

Loading of the sterilising chamber
Liquids in open or closed sterilisation receptacles.
The goods to be sterilised (liquids) are placed in the chamber either on the bottom plate or on sieve trays of the insert rack.

Before **sterilising liquids**, the flexible PT 100 sensor must be placed into the largest vessel or into a reference vessel of which the filling quantity corresponds to the filling quantity of the largest vessel to be sterilised.

When using a reference vessel, take care that the temperature of the reference liquid corresponds to the temperature of the medium to be sterilised. Thus the liquid in the reference vessel has to be refilled, especially before starting the sterilisation once again after a cycle. The consistency of the liquid in the reference vessel must correspond to the liquids to be sterilised.

Take care that the sensor is not squeezed or bent.

The sterilising temperature with liquids is measured in the medium by the PT 100 bottle sensor.

Closing and locking of the chamber door
Take care that the closure lever is in its horizontal position. Press the door plate against the chamber before turning the door lever to its vertical position.

Program selection
For selecting program 3 Key **P3** must be pressed.

The program can only be selected when chamber door is closed.

Display:

.....P3	Program number (Error note)
liquids 121 °C	Program name
..... C streaming	Streaming temperature
…… C bottle	Bottle temperature

Program Start
Press key **Start.**

The program is set into operation by pressing button **Start**.
The program can only be started when
a) the chamber door is closed and locked
b) there is no error note <overheat - sensor defective – water shortage in the storage tank>

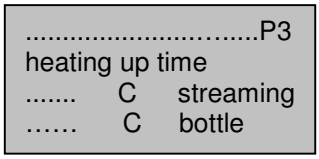
Display:

.....P3	Program number (Error note)
heating up time	Program step
..... C streaming	Streaming temperature
…… C bottle	Bottle temperature

Step 1: Pressing out of chamber gasket
After having started the program, it runs down fully automatically. The chamber door gasket is pressed against the chamber door by the compressed air, produced by the small pressure generator. This provides a pressure-tight closure between chamber and door. The pressure level (approx. 1,5 bar) is determined by an adjusted pressure switch. The actual pressure is controlled by a pressure monitor, which releases further functions when pressure is available in sufficient quantity.

Step 2: Heating-up time / heating and regulation
The heating elements are switched on and heat up the process water in the chamber. They generate the steam necessary for sterilisation. The current temperatures (streaming, bottle) are indicated in the display.

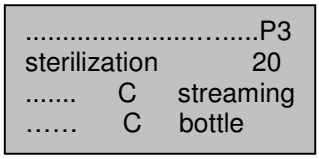
Display:



Program number (Error note)
Program step
Streaming temperature
Bottle temperature

Step 3: Sterilisation / Time Lapse
When the program specific temperature in the medium (liquid) is reached, the sterilisation phase starts. The already passed sterilising time is indicated in the second display line.

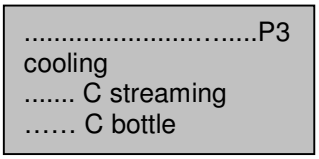
Display:



Program number (Error note)
Program step and current sterilisation time (count down)
Streaming temperature
Bottle temperature

Step 4: Cooling / Self radiation
After the end of the sterilising process the heating elements are switched off, the cooling phase is started. The cooling process is finished when the liquid temperature measured by the bottle sensor is below **80 °C** and the chamber pressure has dropped to **0** bar.

Display:



Program number (Error note)
Program step / Cooling – steam discharge
Streaming temperature
Bottle temperature

Step 5: Release of chamber door
When the liquids have cooled down to **80 °C** and the chamber pressure has dropped to **0** bar, the gasket is relieve. The release of the chamber door is indicated by **end**.

Display:

.....P3	Program number (Error note)
end	Program step
..... C streaming	Streaming temperature
…… C bottle	Bottle temperature

Unlocking and opening of chamber door
For unlocking the closure mechanism and open the chamber door, press key **<T>** continuously while swivelling the vertical positioned door lever to the left side in horizontal position and open the door. (LED of the program key goes out.

Attention: When opening the chamber door, hot steam can escape.

Removal of sterile goods

Attention: The sterile goods can still be hot.

After removal of the sterile goods, water can be added in the chamber (press key Filling) and the sterilizer can be loaded for the next cycle.

When opening the chamber door, the display is reset to the main menu. The LED of the program key goes out. A new program selection is necessary before starting again.

For switching off the unit, the green **ON/OFF** switch must be pressed accordingly (control lamp in the switch goes out).

8.4. Program 4 Liquids variable

Switching on
The sterilizer is switched on by the green main switch.

Display:

P1 = solids	134 °C	Program name
P2 = solids	121 °C	Program name
P3 = liquids	121 °C	Program name
P4 = liquids	var.	Program name

Unlocking and opening of chamber door
For unlocking the closure mechanism and open the chamber door, press key **<T>** continuously while swivelling the vertical positioned door lever to the left side in horizontal position and open the door.

Filling of chamber with process water
By continuous pressing of key **Filling** water is filled into the chamber until the water level has reached the top edge of the land at the front side of the chamber.
The water quantity is sufficient for the complete sterilisation.

Loading of the sterilising chamber
Liquids in open or closed sterilisation receptacles.
The goods to be sterilised (liquids) are placed in the chamber either on the bottom plate or on sieve trays of the insert rack.

Before **sterilising liquids**, the flexible PT 100 sensor must be placed into the largest vessel or into a reference vessel of which the filling quantity corresponds to the filling quantity of the largest vessel to be sterilised.

When using a reference vessel, take care that the temperature of the reference liquid corresponds to the temperature of the medium to be sterilised. Thus the liquid in the reference vessel has to be refilled, especially before starting the sterilisation once again after a cycle. The consistency of the liquid in the reference vessel must correspond to the liquids to be sterilised.

Take care that the sensor is not squeezed or bent.

The sterilising temperature with liquids is measured in the medium by a PT 100 bottle sensor.

Closing and locking of the chamber door
Take care that the closure lever is in its horizontal position. Press the door plate against the chamber before turning the door lever to its vertical position.

Program selection
For selecting program 4 Key **P4** must be pressed.

The program can only be selected when chamber door is closed.

Display:

.....P4	Program number (Error note)
Li – Var. 0 C 0 MIN	Program name with variable set
..... C Streaming	Streaming temperature
..... C Bottle	Bottle temperature

Entering of sterilising time and temperature
The zero before letter **T** (time) is blinking. Enter the sterilising time at the numerical block. Values between 1 and 99 minutes can be entered. Afterwards confirm by pressing key↵. Then enter a value between 105 and 121 °C for the temperature in degree Celsius. Use a **four-digit** value (e.g. 1100 for 110 °C). Confirm the value by pressing key↵. Both values are stored. Having confirmed the values by key↵, the display is reset to 0.

Program Start
Press key **Start.**

The program is set into operation by pressing button **Start**.
The program can only be started when
a) the chamber door is closed and locked
b) there is no error note <overheat - sensor defective – water shortage in the storage tank>

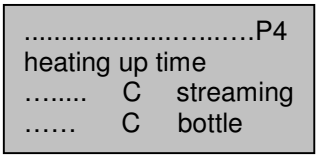
Display:

.....P4	Program number (Error note)
heating up time	Program step
..... C streaming	Streaming temperature
…… C bottle	Bottle temperature

Step 1: Pressing out of chamber gasket
After having started the program, it runs down fully automatically. The chamber door gasket is pressed against the chamber door by the compressed air, produced by the small pressure generator. This provides a pressure-tight closure between chamber and door. The pressure level (approx. 1,5 bar) is determined by an adjusted pressure switch. The actual pressure is controlled by a pressure monitor, which releases further functions when pressure is available in sufficient quantity.

Step 2: Heating-up time / heating and regulation
The heating elements are switched on and heat up the process water in the chamber. They generate the steam necessary for sterilisation. The current temperatures (streaming, bottle) are indicated in the display.

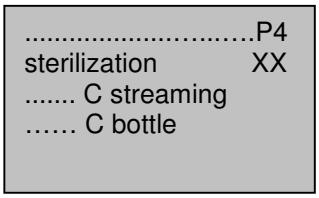
Display:



Program number (Error note)
Program step
Streaming temperature
Bottle temperature

Step 3: Sterilisation / Time Lapse
When the program specific temperature in the medium (liquid) is reached, the sterilisation phase starts. The already passed sterilising time is indicated in the second display line.

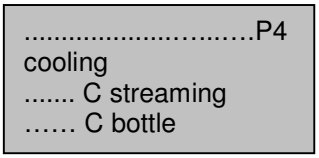
Display:



Program number (Error note)
Program step and current sterilisation time (count down)
Streaming temperature
Bottle temperature

Step 4: Cooling / Self radiation
After the end of the sterilising process the heating elements are switched off, the cooling phase is started. The cooling process is finished when the liquid temperature measured by the bottle sensor is below **80 °C** and the chamber pressure has dropped to **0** bar.

Display:



Program number (Error note)
Program step / Cooling – steam discharge
Streaming temperature
Bottle temperature

Step 5: Release of chamber door
When the liquids have cooled down to **80 °C** and the chamber pressure has dropped to **0** bar, the gasket is relieve. The release of the chamber door is indicated by **end**.

Display:

.....….P4	Program number (Error note)
end	Program step
..... C streaming	Streaming temperature
…… C bottle	Bottle temperature

Unlocking and opening of chamber door
For unlocking the closure mechanism and open the chamber door, press key **<T>** continuously while swivelling the vertical positioned door lever to the left side in horizontal position and open the door. (LED of the program key goes out.

Attention: When opening the chamber door, hot steam can escape.

Removal of sterile goods

Attention: The sterile goods can still be hot.

After removal of the sterile goods, water can be added in the chamber (press key Filling) and the sterilizer can be loaded for the next cycle.

When opening the chamber door, the display is reset to the main menu. The LED of the program key goes out. A new program selection is necessary before starting again.

For switching off the unit, the green **ON/OFF** switch must be pressed accordingly (control lamp in the switch goes out).

9. Technical and Safety Devices

9.1. Chamber door – Door closure

The chamber door is a well insulated massive chrome nickel steel plate, designed as swivel door and cased by stainless steel sheet. It is equipped with a safety closure. The closure bolt of the chamber door has two locking wings at its end. These can only be led through the closing loop when the door lever points to the middle of the door. A contact switch inquires the position of the locking wings. When the door lever is in vertical position, the contact switch is actuated. The locking bolt of the door magnet blocks the locking loops in their position and thus prevents an unprofessional and unintended opening of the chamber. The tightening of the chamber is effected by a blowable silicone round coil gasket. The door can only be opened when all conditions relating to safety are fulfilled.

9.2. Safety closure of door

9.2.1. Temperature

As KSG 25-2-5 in this model is also suitable for sterilisation of liquids, it must be equipped with a safety closure, which forbids the release of the chamber door gasket system resp. the unlocking of the closure mechanism and thus the opening of the door during the **Liquid programs** and the critical conditions of the medium.

A flexible PT 100 bottle sensor is used, which can be put into a reference vessel and transmits the current temperature data of the medium to the control system during the process flow. The control system blocks the locking magnet at a medium temperature of >80 °C and releases it in the cooling phase only when the medium temperature is falling below 80 °C.

9.2.2. Pressure

At the end of the program cycle, the chamber door gasket system is only released resp. the closure mechanism is only unlocked when pressure in the chamber is < 0.1 bar. This is controlled by two independently working pressure controllers, which are routed by the inner pressure of the chamber. The pressure controllers supervise themselves, i.e. the control systems inquiries whether they have changed their contact position during the pressure phase. If this is not the case, there must be a failure. The chamber door gasket system will then not be released and the closure mechanism is not unblocked (LED in key <T> not illuminated). In this situation every other intervention in the device is to be refrained from. For the removal of the disturbance an technical engineer certain by the operator or an authorized service technical engineer is to be instructed.

The release of the safety closure is indicated by text **end** and the illuminated LED in key **<T>**.

Attention: The door of an apparatus with safety closure can only be opened when the apparatus is connected to current.

9.3. PT 100 Streaming Sensor

The PT 100 streaming sensor is **continuously** controlled with regard to short circuit or breakage. Short circuit or breakage will be indicated by a clear text note in the first display line. Then **no** program can be started. If a short circuit or breakage happens during an already started program for solids or liquids, the program will be interrupted. During programs for solids, release of the chamber gasket system resp. the closure mechanism is effected at a chamber pressure of < 0,1 bar, during liquid programs at a chamber pressure of < 0,1 bar **and** a medium temperature of < 80 °C. The release is indicated by the illuminated LED in key <T>/open.

9.4. PT 100 Bottle sensor

As the PT 100 bottle sensor is only necessary for **Liquid programs** P3 and P4, it must be winded slackly on the winding device when it is not used. Pay attention that the sensor is never squeezed or bent. During programs P3 and P4 the bottle sensor is continuously controlled with regard to short circuit or breakage. A short circuit or break is indicated by clear text note in the first display line. Then the liquid programs cannot be started. If a short circuit or breakage happens during an already started program, the program will be interrupted. The chamber lid gasket system will then not be released resp. sucked back and the closure mechanism is not unblocked (LED in key <T>/open not illuminated).

9.5. Level regulator in the storage tank

A level regulator which controls the water level is built-in the storage tank. In case of water shortage in the storage tank the program cannot be started. A program start is only possible when the process water in the storage tank has been added. The water shortage is indicated in the first display line as clear text. By refilling the storage tank with process water the water shortage device will be reset and the Error note in the display will be effaced.

9.6. Safety valve

The apparatus is equipped with a mechanical safety valve (2,7 bar), which protects the chamber from overpressure > 2,7 bar. The overpressure will be releases into the storage tank.

If due to a failure of the pressure regulator the heating elements are not switched off, the safety valve prevents an inadmissibly high steam pressure in the boiler. It opens at an overpressure of > 2,5 bar and gives way to the outside in order to lead away the excessive steam. When the safety valve has reacted, the sterilizer must be switched off at the green main switch.

9.7. Record printer - Option

For recording the course of the solution-temperature during a sterilisation cycle there is a standard interface (pin jack) for recorder, to which each recorder with an input of PT 100 (Ω). The polarity of the recorder and the contact sockets have to be considered.

9.8. Thermic overheat protection device

The sterilizer has a highly efficient thermal overheating protection device, which switches off the heating in case of overtemperature automatically. The disturbance is given in the first display line as a clear text. With switching off the overheating protection switch the cooling phase is introduced in the chamber and the sterilising good. A new start of the program is only possible when the error has been removed.

In most cases the reason for the release of the overheat protection device is a low quantity of water when filling the chamber.

When the overheat protection device has reacted, the heating elements are switched off and the cooling phase is started. The cooling down phase is to be maintained as long as, since the chamber pressure fall in the solid program on **0** bar (see chamber pressure gauge), or in the solution program, in addition, also the solution temperature is sung under **80 °C**. If these condition are given, the LED shines in the key <T>.

After the camber door is opened, the process water can be refilled by pressing key Filling. Before filling in the process water, the goods to be sterilised must be taken out of the sterilising chamber. After the filling process, the goods to be sterilised can be put into the sterilising chamber again, the door can be closed and locked.

In order to reset the mechanics of the overheating protection device after an adequate cooling process, the **water shortage reset** push-key is to be operated below the right front casing of the sterilizer (if necessary remove the screw-on cap). The Error note in the first display line is thereby deleted. Afterwards switch off the sterilizer at the green ON/OFF switch for approx. 5 seconds and afterwards turn on again the switch.

No the program can be selected and started again.

Attention: In case of reaction of the overheat protection device there is a water shortage in the chamber. The goods inside the sterilising chamber must be considered as not sterile. Therefore the goods must pass a complete sterilising cycle in order to be sterile.

10. Cleaning and Care Instructions

The chamber has to be cleaned and maintained thoroughly. Corrosions and spots can attack the stainless steel.

The chamber has to be cleaned from fluffs and other smudges.
The best is to use a liquid detergent for stainless steel.
Do not use steel wool!

Rust spots have to be removed by emery paper or similar material.

10.1. Cleaning of chamber

The chamber of the cold apparatus has to be cleaned daily before setting in operation. For this it is urgently necessary to take out of the chamber all objects such as the sieve trays as well as the insert rack. Apart from the chamber, the sieve trays, the insert rack, the bottom plate and the inner side of the door plate have also be cleaned. In general, it is sufficient to execute the cleaning by means of a damp, lint-free rap.

In case of several operations per days the chamber has to be inspected after each removal of sterile goods if there are no remaining packing materials or adhesive taps which have to be removed before the new sterilisation.

11. Maintenance Hints

General remarks

The use of sterilizers is generally subject to the pressure vessel regulation. The user is responsible for the proper compliance with this regulation.

Abstract from the pressure vessel regulation

§ 13 operation of pressure vessels

1) Everyone who operates a pressure vessel has to take care of a proper condition, a proper operation, that the necessary maintenance works are carried out immediately and that the necessary safety measures are taken.

2) From case to case necessary survey measures can be directed from the authorities.

3) A pressure vessel should not be operated if it shows defects which endanger operators or third persons.

The delivered sterilizer is a steam autoclave. Its chamber, closure and command system are subject to a current wear and tear by pressure, heat and distilled water.

We recommend that the apparatus is maintained regularly by our specialized staff. The intervals should be every four months or at least every six months (depending on stressing). If 400 cycles have been reached before six months have passed, the maintenance intervals must be shortened.

11.1. Drainage of Storage Tank

For drainage of storage tank the sterilizer is equipped with a drain valve. This is located behind the door plate on the right lower side. In order to execute the drainage screw the delivered drain hose with the coupling nut on the outlet thread of the valve. Put the loose end of the drain hose into a bucket or another suitable vessel. Then open the valve by a screwdriver and wait for the end of drainage. Afterwards close the valve and renew the process water of the storage tank.

Horizontal slot	valve closed
Vertical slot	valve open

It is strongly recommended that the process water of the storage tank is emptied completely and renewed in regular intervals - depending on the frequency of use – however at least once a week.

Regardless of the regular emptying and renewal of process water, a manual cleaning of the storage tank at least every six months is necessary. The manual cleaning of storage tank is part of the maintenance in connection with a maintenance contract.

11.2. Maintenance of Chamber Gasket

Silicone fat
To achieve a longer durability of the door gasket and to guarantee a safe tightening between chamber and door blade, the blocking resistance of the chamber gasket must be maintained continuously. Therefore the door gasket should be removed from the gasket groove and cleaned daily before operating the sterilizer.

As the grease looses its separating ability also by air contact, the maintenance intervals depend not only on the frequency of use, but also on the blocking resistance of the chamber gasket.

Cleaning of the gasket should be done when the unit is cold. For protecting the hands, the use of one-way rubber gloves is recommendable.

The gasket is removed from the gasket groove by the S-shaped gasket-drawer. Then the gasket has to be cleaned by a lint-free rap and afterwards to be checked, whether there are no wear and tear spots or damages. A defective or worn-out gasket has to be replaced.

Afterwards the gasket groove must be cleaned. For greasing the gasket, take a small quantity (approx. the size of a walnut) of grease on the palm of one hand and rub it between both palms, before you draw the gaskets through your hands. Then put the greased gasket back into the gasket groove.

The blocking resistance of the gasket must be checked before each setting into operation.

We strongly recommend that you always dispose of s spare gasket, as a defective gasket makes it impossible to operate the unit and causes an unnecessary stop.

Silicone spray
When using a silicone grease spray sold by KSG Sterilisatoren GmbH the chamber door gasket has to be sprayed **daily** before the first operation of the machine.

For cleaning reason the gasket must be taken out of the groove every 4-5 weeks. Then the gasket as well as the groove has to be cleaned by a dry, lint-free cloth. It has to be verified that the chamber door gasket is not worn-out or damaged. A worn out or damaged gasket must be replaced. After cleaning the groove it has to be sprayed with the silicone spray. Before placing back the gasket into the groove the gasket has to be sprayed all over with silicone spray.

11.3. Important Things about Stainless Steel

Rust- and acid-resisting steels are only resistant to electro-chemical attacks - incl. corrosion - as long as their surface is passive, i.e. as long as the surface is metallic smooth. This can only be achieved by cleaning these steels regularly.

Normal water with soap is the best for removing normal dirt. The cleaning procedure can be accelerated by using commercial soluble detergents. Do not use scouring agents! Extreme contamination's by alkaline or mineral deposits can be removed by 10 - 20 % nitric acid under consideration of the usual precautions.

External rust
As the surface of the stainless steel is covered with a molecular passive lamination occurred by the influence of oxygen, rust is only built under extremely unfavourable conditions.

Iron and rust molecules as well as base metals, which penetrate the passive lamination, activate the stainless steel and start the formation of rust. Therefore care has to be taken that iron or rust will never be transferred to stainless steel. Even alloyed stainless steels are affected by external rust.

Localized corrosion
In this case the passive surface mentioned above is attacked at very small points by liquid Liquids, halogens and their salts (bromides, iodides, chlorides and fluorides). The liquid resolves the metal under the passive surface. Craters and hollows will then arise in the stainless steel and lead to holes.

Other destroying effects
Some commercial sterilising liquids show split corrosion effects. If these liquids are provided with the additions indicated by the manufacturer, they are without any danger for the stainless steel.

12. Technical Data

	KSG 25-2-5
Outer dimensions:	51 x 58 x 60 cm (H x B x T)
Chamber dimensions:	25 x 25 x 60 cm (H x B x T)
Chamber volume:	28 Litre
Electrical connection:	230 V AC / 50 Hz / 3,5 kW / 15,3 A
Operation weight:	ca. 100 kg

Hospitalia International GmbH	A-Nr. 184526 vom 13.04.10		19.07.10
	S-Nr. 7883 – 7884– 7885 –		
Borkenberg 14	K-Nr. 41198	KW 24/10	
61440 Oberursel	**Aukl 002 696**	**KSG-25-2-5**	

Elektroplan 09E2525S001 // Rohrplan 09R2525S001

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